THE BOSTON
MEDICAL AND SURGICAL JOURNAL.

VOL. XCIV. — THURSDAY, JANUARY 20, 1876. — NO. 3.

## THORACIC ANEURISM TREATED BY ELECTROLYSIS, WITH REMARKS THEREUPON.

BY HENRY I. BOWDITCH, M. D.

T. A. S., forty years old, was by occupation a chief engineer in the United States navy. His father died of inflamed bowels, his mother of carcinoma uteri. In 1851 he entered the United States navy. In general he had been tolerably well, though never very strong; he had never had any long illness, and did not remember ever having severely strained himself. Previously to calling on me he had for three or four years had a little palpitation. In 1869, while at Norfolk, Va., he felt "run down" and generally unwell. A widower, he married a young wife in January, 1872. A cough appeared in the following spring and lasted about ten days, and then suddenly disappeared. He raised during these days, only a little froth, without blood at any time; but he could sleep only on his right side, since lying on the left side caused cough. During the following summer he considered himself as well as usual. He was able to walk as freely as ever until pulmonary symptoms reappeared three weeks before he called on me. At that time, one morning, when dressing, in the act of straightening his body in order to comb his hair, he was suddenly seized with a violent paroxysm of coughing, which could be relieved by gently bending forward his body; but it was renewed when he placed himself in an erect posture. This condition of things continued ten days, during which he was quite exhausted by the cough; it caused restless nights, and compelled him to lie upon the right side. His appetite, however, continued. He had no hectics. In about ten days the cough was much lessened; but meanwhile, as he expressed himself, "he had lost some flesh" and "all his strength," and "his wind was wholly gone." His wife had heard a kind of "clicking" in the throat, apparently above the collar-bone. He had given up all duty for ten days.

At his first visit to my study he was found to be a well-formed man with evident dyspnœa, not of the severest kind. He had a hard, dry cough. His pulse was 84 and not peculiar. He reported that usually he felt the best in the afternoon.

***Physical Exploration.*** The superficial veins of neck and chest were distended. A distinct rounded prominence was seen between the right clavicle and the fourth rib. The intercostal spaces, however, were visible. The swelling was most prominent at the second rib, and at that part there was a distinct impulse with each motion of the heart. Semi-bronchial respiration was noted there, without râle. The whole of the prominence was flat on percussion, most so at the centre, and generally a little less sound in the right breast than in the left. Nothing peculiar about the heart. Save in the spot above named the lungs seemed well, front and back. Perhaps the right back had a little less sound on percussion than the left. Laryngoscopic and sphygmographic examinations revealed nothing definitely diagnostic. It appeared to me to be evidently a case of aortic aneurism, projecting from the arch towards the front and pushing forward the ribs. The limited locality in which the impulse was felt, namely, a space about two inches long in the second intercostal space, and the fact that only a very small portion of the lung seemed pressed upon, made the case not inappropriate for the trial of electrolysis. The patient had tried various remedies under other physicians, but had obtained no relief.

November 12th. His nights had been troubled by dyspnœa, but he had been more easy when lying in a semi-recumbent position. Pulse 72, smaller, a little irregular, equal in both wrists. Mind clear and calm in anticipation of the operation, which he had consented to, as he felt that it afforded the only possible chance of relief or cure. It was upon that ground alone that I advised the operation.

Drs. J. Collins Warren and J. J. Putnam consented to aid me. Dr. Warren introduced three steel needles. I chose the softest and most central part of the tumor as the spot for their introduction. The needles were covered with varnish save at the very points. All were within half an inch from one another, and nearly parallel. They passed readily in about an inch and a half, and the extremities farthest from the chest undulated very visibly and undoubtedly under the influence of the aortic current. To these needles, which represented the positive pole, Dr. Putnam attached twelve and, after some minutes, fifteen cells of the Störer battery, increasing the current gradually from zero. The introduction of the needles caused no pain. At the negative pole was a large pad; it was placed on the left breast on a part corresponding to that in which the needles were placed in the right. A slight pricking sensation was caused under this pad, but no real pain or other discomfort was felt during the fourteen minutes the operation was continued, except that towards the last the patient had pain low in the left back of the chest. Three minutes after this, pain began (fourteen and one half minutes from the commencement of the current), the pulse rose to 92. The needles were still swaying strongly backward and for-

ward as at the beginning of the operation. Soon the patient became pale, and looked faint; the pulse failed and the hands were cold; evidently serious results were threatening. The needles were immediately withdrawn. Only a drop of sero-sanguinolent fluid escaped at each minute aperture. The pulse was lost a few moments at the wrist. The patient was laid flat in bed and was soon relieved from these untoward symptoms. The needles were all discolored and one was corroded. The patient soon recovered wholly his quiet of body and calmness of mind. He was ordered to remain perfectly at rest; to take beef-tea and milk, with a little brandy, for diet. Some strips of adhesive plaster were applied over the tumor.

In a few hours one could not have recognized that the operation had been performed, except that in regard to every symptom the patient had greater comfort than he had had for several days before the operation.

November 13th. I found that the relief had continued. The pulse, by report, had been about 84. The patient had had no uncomfortable symptom, only a slight local soreness where the needles were introduced.

November 14th. Much the same as the day before, although he had required the paregoric during the night because of his restlessness. He had perceived nothing materially different in his sensations since the operation. His aspect was that of comfort rather than of distress, and his respiration seemed easy. Pulse 86. The tumor was examined through the adhesive plaster; it had a hard, solid feel, very different from the soft pulsation observed before the operation.

November 15th. Patient more restless and having some dyspnœa; opiates needed twice. At the time of the visit he was lying on his right side. Motion caused pain in front and sometimes in the back of the chest. Pulse 72, quiet.

November 17th. He was sitting up, looking easy. The previous night he had been almost able to lie on his back. Slight sonorous râle was heard in both lungs. He was desirous of having a second operation. I found the tumor more prominent, apparently from external inflammation. It was more solid, and the impulse was less distinct.

The patient being placed, as at the previous operation, in a semi-recumbent posture, three needles were introduced as before; there was much less motion of them. Dr. Warren assisted me, Drs. Putnam and Oberly being present also. Twenty cells were at first used, a galvanometer having been previously introduced into the current; the needle showed a deviation of thirty-three degrees. After three minutes twenty-two cells were used. At the fourth minute six more cells were added, causing a deviation of forty-five degrees. The pulse became a little weakened at the fifth minute. At eight and one half minutes the pa-

tient had some pain in the right arm to the elbow. At twelve and one quarter minutes the deviation was forty-six degrees, and the patient felt faint. The number of cells was reduced to sixteen, and the deviation fell to thirty-nine degrees. At fourteen minutes the pulse became weak, 80, and the needles were removed; the first of these had entered one inch and one eighth; the second, one inch and nine sixteenths; the third, one inch and a half. The introduction of them had been more difficult than at the previous operation, owing to the solidity of the tumor.

During this operation, as at the first, no untoward symptoms appeared until after fourteen minutes, when the pulse and strength fell off. In both instances the removal of the electrical current relieved the patient, and the pulse regained its force.

Six P. M. He was entirely comfortable; the pains in the back and arm had gone; the countenance was bright; he was cheerful and hopeful. Pulse 80, regular, sufficiently full. There was little or no cough.

November 18th. The report was that the patient had had a comfortable night; three drachms of paregoric had been taken. There was a slight redness of the nose, but no pain or dyspnœa or fever. The digestion was normal. Pulse 92, strong. Urine free. The patient was directed to omit the opiate if possible.

November 19th. A very restless night (but without pain or dyspnœa), till the opiate was taken with relief. There was pain in the shoulders towards evening. Pulse 84. The tumor had a very different feel from that which it had before the first operation; it was decidedly firmer, giving the impression of a solid mass; there was no distinct fluctuation, but the swelling projected more. Although there was no external redness or tenderness, it seemed plain that all the parts around the points of puncture were swollen and hardened.

| | |
|---|---|
| Chloral hydrate . . . . . | gr. xv. |
| Potassii bromidi . . . . . | gr. v. |

To be taken at bedtime and repeated *pro re natâ*.

November 20th. Delirium in the night, after the chloral, although the day was comfortable and the mind was clear. The appetite was fair. A slight wheeze and hoarseness were noticed in the breathing. Pulse 84, smaller; veins slightly distended. Tumor evidently larger, with a deep-seated pulsation. Omit bromide at night, if possible.

November 23d. Owing to the apparent evil influence of the bromide, it had been omitted for two nights. The patient had sat up a good deal for relief. He was able to lie more nearly upon his back. When on the left side he had pain in the tumor.

November 26th. He had been comparatively comfortable. The tumor was smaller and still solid, with only the slightest impulse. But there was bronchial respiration over the whole extent of the tumor.

November 30th. The patient reported that he had lain on the left side, and felt easy.

December 3d. Had lain indifferently on either side, and had walked in his chamber. There were no pains in the back and arms.

December 6th. Rather more wheezing, which, with the slight cough, can be relieved by throwing the head backward. Less appetite. A slight suppuration at one of the points where a needle had entered; otherwise no apparent inflammation or other external result from the operation.

December 11th. Pain in both sides. Pulse 80, less in the right radial than in the left.

December 14th. Some dyspnœa, requiring the patient to sit up at times. Pulse 60 to 70, and quite small in both radials. Digestion still fair.

December 20th. Nights more restless, and the patient was growing weaker. He complained of more pulsation and heat in the tumor. Cough increased. No fever. Digestion still good. For two or three days the left hand had felt cold. The tumor was larger, and extended to the fourth rib; it was quite solid, but towards the axilla there was an evident deep pulsation, and tenderness existed there. There was a ittle bronchial respiration at the front and in the back. Pure vesicular murmurs generally, in both lungs.

December 28th. Some dysphagia during the past week; otherwise no material change.

January 3d. Severe pain in the chest; more cough; sputa frothy-white. The nights are tolerable; extract of valerian is taken as a sedative. The tumor is still larger, but quite as solid; in fact, the whole of the right breast is pressed out, and vesicular respiration is absent throughout that front and lessened in the right back. Through the left lung, front and back, the respiration is loud, puerile. On the day before (January 2d), owing to pain, two leeches had been applied, which had caused free bleeding.

January 6th. The tumor is larger, more painful. The patient had morphine injections with comfort. His countenance is much worse. Feet swollen. Bronchial respiration behind at the root of the right lung.

January 16th. A letter from the attending surgeon says, "Mr. S. still exists, but no better than when you last saw him. About a week ago he was suddenly seized with dyspnœa resembling asthma, during which his hands and ears became livid; from this he recovered only to have a more severe attack within twelve hours. When I saw him he was gasping for breath, with livid lips, ears, and face, and almost imperceptible pulse. The tumor has grown much larger within a few days." The right lung was almost wholly useless, and the left was much impaired. Both legs, the right arm, and the right side of the thorax were greatly œdematous. Scarcely any pulse in the right wrist; that in the

left was very small and feeble. The impulse of the heart shook the chest and head. He could not lie down; an attempt to do so a few days previously caused such dyspnœa that he was thought to be dying. He sat up, resting his head on a chair in front of him. Little pain. No appetite. The hypodermic use of morphine kept him easy. The mind was terribly disturbed; violent outbreaks of passion occurred; he was delirious at times.

January 21st. He died quietly.

*Autopsy* by Dr. Fitz, January 22d. Body well formed, though small; marked rigor mortis; evident emaciation. Head not opened.

Right chest much less distended than during life. A slight rounded prominence, two inches in diameter, near the cartilages of first, second, and third ribs of the right side. The skin over the upper anterior half of the right breast was firmly united to the ribs, mainly through thickening and condensation of the sub-cuticular areolar tissue. The pectoral muscles were less in size than normal. The intercostals were pale and translucent, containing numerous gray and opaque lines apparently of fibrous tissue. At one part, between the first and second ribs, the intercostal muscle was absent over a space of the size of the finger-nail; a pale, friable coagulum filled the space.

The pericardium and heart showed no sign of disease.

The left lung at its apex was adherent; and in the upper lobe, especially towards its upper part, were numerous small, gray nodules, slightly opaque, grouped together in a more or less foliate manner. Elsewhere were occasional minute cheesy spots surrounded by dense pigmental fibrous tissue. The pleura near these spots was puckered and contracted. Similar appearances were observed in the upper part of the right lung. This lung was so firmly adherent anteriorly that to separate it the scapel was needed. Posteriorly, the pleura costalis could be torn up with the finger. The lower lobe was separated from the diaphragm by about a pint and a half of clear yellow serum. This lobe was a more or less rounded mass; the pleura over it was thickened, contracted, and opaque. The pleura was generally thickened everywhere, but there were no adhesions. From the ascending aorta an aneurism of the size of an infant's head projected and pushed out laterally and upward above the superior vena cava and its branches. Its walls were thick except in the intercostal space formerly alluded to. The branches from the arch were unaffected. The inner surface for half an inch above the valves was comparatively unaltered, though the arch had undergone considerable dilatation. The interior of the sac proper was lined by a dense, partly decolorized, laminated thrombus, spread over the surface with tolerable uniformity. There was no one point where the clot seemed to show any definite relation to the probable entrance of the needles used in puncturing. The thoracic and

abdominal aorta showed occasional patches of chronic endarteritis. In the right subclavian vein was an old thrombus almost completely obstructing the vessel. This vein had been cut off more than an inch and a half from its terminus; hence its cervical extent could not be ascertained. The left subclavian and azygos veins were unobstructed.

The œsophagus showed no signs of pressure. The mucous membrane of the trachea, in the immediate vicinity of the bifurcation, presented marked alterations; extensive ulcerations of it had occurred, exposing the cartilages over half of the circumference of the trachea. The mucous membrane adjacent to this was red and opaque, and both that and the ulcer were covered with a muco-purulent secretion. The spleen was normal. In the kidneys were alterations due to chronic passive congestion. The liver was normal in size; the hepatic veins were gorged with blood. There was an approach to the nutmeg condition of the acini. The stomach and intestines were not examined.

*Remarks.* I believe this is the first case in this country of aneurism of the arch of the aorta in which electrolysis has been tried. But Dr. Keyes reports a case[1] in which it was applied to an aneurism of the abdominal aorta. Four applications were made, March 30, April 6, May 4, June 22, 1871. Death occurred July 18th. Pain and nausea were relieved and the patient felt generally better, but was exhausted.

As will be seen by the preceding history, although the tumor became harder after both operations, and lost a good deal of its impulse, and although in some respects the patient was relieved, as, for example, of his inability to lie save on one side, there was no real improvement, and death occurred sixty days after the first operation. This is not a very flattering result.

Let me now touch a little upon European and American experience, and finally try if possible to decide under what circumstances we ought to operate.

Ciniselli, a distinguished physician in Italy, first proposed and performed the operation upon aortic aneurism. In 1870, he reported nine cases between 1846 and 1866, fourteen between 1868 and 1870; twenty-three in all.[2] Four of these only had been operated on by Ciniselli; nineteen were treated by others. The earlier cases were more fatal than the later ones. Only four out of the twenty-three seemed cured at the end of four, eight, eight and a half, and nine months. The number of operations in each case was as follows: in one case, twelve operations; in two cases, six; in seven cases, one; in eleven cases, two.

The numbers of needles used in the operations were in four cases,

[1] New York Medical Journal, December, 1871; quoted in Beard and Rockwell's Medical and Surgical Electricity, New York, 1875, page 754.

[2] Annali Universali di Medicina, ccxiv. 292, November, 1870; Schmidt's Jahrbücher, cl. 31, 1871.

two; in seven cases, three; in seven cases, four; in one case, five; in three cases, six; and in one case, seven.

The number of minutes during which electricity was applied was as follows: —

In three cases it continued five minutes; in four cases, thirty minutes; in two cases, ten minutes; in two cases, twenty minutes; in two cases, fifteen minutes; in one case, eighteen minutes; and in two cases, thirty-five minutes.

Ciniselli uses the following arguments for operating: —

(1.) Electro-puncture is the most rational method of treating aneurisms of the aorta, internal as well as those externally visible.

(2.) Electricity causes coagulation of the blood while being applied, and this effect increases after the operation is concluded, till the clot fills the sac and makes it a solid tumor.

Among the favorable circumstances are: (1.) An aneurism inside of the walls of the chest. (2.) A sac projecting from the walls of the aorta with a narrow mouth. (3.) No complication with other inflammations or disturbances of the circulation than those caused by the tumor itself. (4.) A good constitution of the patient.

The above would be favorable even if the tumor were distinctly protruding through the walls of the chest.

Unfavorable circumstances are: (1.) Atheromatous disease of the artery. (2.) Local inflammations. (3.) Large mouth to the sac, or an enlarged artery communicating with the sac. (4.) If the aneurism project much from the surface of the chest and the opening from the artery be large enough to allow the blood freely to circulate, it may circulate in and around the coagulum, and if the covering of the aneurism be soft or sloughy, fatal external hæmorrhage may occur.

In all such unfavorable circumstances we must speak freely with the patient about the risks of the operation.

The electrical apparatus must have sufficient force and tension.

This method of treatment has apparently not been much used by others on the Continent of Europe.[1] In Great Britain, however, it has been employed, and cases are published. Among them are the following: —

Dr. John Duncan, of Edinburgh, in a long article read before the Medico-Chirurgical Society, March 7, 1866, on galvano-puncture in aneurisms,[2] cites a case which he claims as the first of its kind in Great Britain. A man forty-five years old consulted Dr. Duncan in 1864. Various remedies were ineffectually tried. The tumor covered half of the sternum and of each clavicle, and measured thirteen inches. Vari-

[1] Pétrequin, of Lyons (Althaus, Value of Galvanism, London, 1846), first used galvanism for aneurisms.

[2] Edinburgh Medical and Surgical Journal, April, 1866, page 920.

ous nodules threatened to burst, superficial ulceration occurred and bloody fluid was exuding, and finally, copious hæmorrhage took place just before the operation was done. December 3d, needles were kept in two hours and a half. Gas was disengaged during the operation. December 4th, two more needles were introduced and retained twenty-five minutes, when gas again escaped. The patient died December 11th. In Dr. Duncan's history of the operation, he says that Liston operated in 1832 on subclavian aneurism. He gives Ciniselli's tables of fifty cases, of which twenty-three were cured, twenty were not cured, and seven died; four only were on the thoracic aorta, and these four were not cured. He states that intense pain is sometimes caused, and he advises needles of the smallest size.

In the *Edinburgh Medical and Surgical Journal* for August, 1867, Dr. Thomas R. Frazer treats of the subject, and gives a case in which sloughing ensued after the operation. The tumor augmented, and a second operation was performed. Clots were formed, but death was not delayed. Dr. Frazer would use galvanism to prevent an external opening, not hoping to cure an internal aortic aneurism. Experiments on the effects of galvanism are subsequently given.

In the *Edinburgh Medical and Surgical Journal* for 1870 [1] is a notice of three cases published by De Cristophoris of Milan. In all three instances the disease ended in death, although in the first it seemed mitigated for a time and delayed. In the second, death ensued from external hæmorrhage, two days after the operation. In the third, great relief followed temporarily, but death with internal hæmorrhage in eleven days.

Dr. Charles Bastian [2] gives a very interesting lecture on the whole subject, founded on a case in which he used electrolysis. He speaks of its innocuousness in the cases referred to. He operated October 8th, 13th, and 18th, and the patient died October 29th. A sacculated aneurism of the most favorable kind for an operation was found. A clot unattached, but which Dr. Bastian considered the result of the operations, was found in it. Dr. Bastian used the needles as we did, that is, with the positive pole of the battery applied to them; and he considers that the best method.

In *The Lancet* for June 20, 1874, Dr. McCall Anderson, of Glasgow, reports the termination of a case first published in 1873,[3] in which galvanism was used four times with the result of lessening the tumor to one fourth of its previous size. It had become solid, and the pulsation was much lessened. The patient felt well, though there was still a pulsation in the chest, and Professor Anderson did not claim the case as one of perfect cure, but at the same time he says, "No one can deny

[1] Page 537.
[2] The Lancet, November 22, 1873, page 594, and November 29, page 623.
[3] The Lancet, February 22, 1873, page 261.

the vast benefit which the patient has derived from galvano-puncture." She went out to heavy work contrary to advice, and continued four months so occupied. The symptoms were all aggravated, and the patient died January 7, 1874, about thirteen months after the operation.

Anderson advises to use the positive pole as we did; he recommends a large-celled battery, but a weak current.

The following is a tabular statement of these facts up to November 7, 1872; it comprises all that I have been able readily to find.

THORACIC ANEURISM — ELECTROLYSIS.

| Date. | Name. | Number of Cases. | Result (unknown in 13 cases). | | |
|---|---|---|---|---|---|
| | | | Cure. | Death. | Relief. |
| 1846–70. | Ciniselli.[1] | 23 | 6 | | |
| | do. (in Althaus.)[2] | 2 | 1 | 1, after four mos., suddenly. | Great relief in the interval. |
| 1866. | Duncan.[3] | 1 | | 1, on eighth day. | |
| 1867. | Duncan and Frazer.[4] | 1 | | 1, not delayed. | |
| 1873. | Bastian.[5] | 1 | | 1, on twenty-first day. | |
| 1873. | Althaus.[2] | 3 | | 1. | 2. |
| | do. (Arteria innominata. | 1 | | 1, in a few days. | |
| 1874. | Anderson.[6] | 1 | | 1 in thirteen mos. | Prolonged relief. |
| 1870. | De Cristophoris.[7] | 3 | | 1, late. | Mitigated and relieved. |
| | | | | 1, in two days. | Great relief. |
| 1872. | H. I. B. | 1 | | 1, in eleven days. | Great relief. |
| | | | | 1. | Relief to certain symptoms. |
| | | 37 | 7 | 11 | 6 |

A little less than one third die soon. A little more than one third are either cured or relieved. Less than one fifth are cured, and even these have relapses.

What ought to be our position now in regard to this operation? I should hold the following principles to be correct: —

(1.) In any case in which treatment such as Valsalva's, as modified by Tuffnell, or still further as suggested by myself,[8] and in which there can be no doubt from the physical exploration of the chest that aneurism of the arch of the aorta exists; if, moreover, we find that the lungs

[1] Sugli aneurismi dell' aorta toracica. Milano, 1870; New York Medical Journal, December, 1871.

[2] Medical Electricity.

[3] Edinburgh Medical and Surgical Journal, April, 1866, page 920.

[4] Edinburgh Medical and Surgical Journal, August, 1867, page 101.

[5] The Lancet, November, 1873, page 594.

[6] The Lancet, June 20, 1874.

[7] Edinburgh Medical and Surgical Journal, June, 1870, page 537.

[8] Proceedings of the Boston Society for Medical Observation, February, 1866, and subsequently published in the Boston Medical and Surgical Journal.

are not very much involved, if we have made up our minds that the case tends certainly to death, perhaps attended with severe suffering, — in such a case there can be no doubt that we should be justified in advising electro-puncture, for relief at least, and with the hope of a cure if the aneurism be small.

(2.) As to how it should be done, whether by applying to the needles the positive pole or the negative, or both, or one and the other alternately, I think no decision can be made further than this: the positive pole causes a firmer clot, and disengages less gas than the negative. It was used in our case. A great diversity of opinion exists as to these questions, which cannot be settled till we get further facts.

(3.) A mild current should be used at first, and continued for some time. I have questioned whether in our case we did not too rapidly increase the number of cells, and whether it were not on that account that our patient had the peculiar symptoms.

(4.) Absolute rest before and after the operation, if possible in a perfectly horizontal posture, should be maintained for months, according to the principles laid down by Tuffnell, although I would allow a little more food than he does.

(5.) In regard to drugs, I should be governed by circumstances; gentle laxatives are admissible; perhaps digitalis, if the pulse be too rapid. Iodide of potassium might be tried; also cold or compression; if need be, leeches might be applied.

## RECENT PROGRESS IN PHYSIOLOGY.

BY H. P. BOWDITCH, M. D.

### TRANSFUSION.

Physiological investigation within the last few years has greatly extended our knowledge of the conditions under which transfusion may be successfully performed. About two years ago, Worm Müller[1] studied the dependence of the arterial blood-pressure on the amount of blood circulating in the vessels. His experiments were made on dogs, and his conclusion was that three distinct grades of fullness of the blood-vessels were to be recognized: —

(1.) A grade extending from the greatest anæmia consistent with life to a condition in which the vessels contain twenty or thirty per cent. less than their normal amount of blood.[2] Here the arterial blood-pressure increases quite regularly from twenty-five to one hundred and thirty millimetres of mercury, in proportion to the amount of blood present in the vessels.

[1] Arbeiten aus der physiologischen Anstalt zu Leipzig, viii. 159.

[2] The blood of the dog is estimated at 7.7 per cent. of the weight of the animal.

(2.) A grade extending from a condition in which the vessels contain about twenty-five per cent. less to one in which they contain from thirty to fifty per cent. more than the normal amount. Here the rise of blood-pressure with increasing volume of blood is very slight.

(3.) A grade in which the blood-volume exceeds the normal amount by more than thirty to fifty per cent. Here the blood-pressure remains unchanged, because the vessels are, according to the author, abnormally stretched.

The first grade is characterized by liability to anæmic convulsions; the third by the occurrence of vomiting. In the second grade no morbid symptoms are noticed, and this grade may therefore be regarded as representing the limits within which the vessels have the power of adapting themselves to their contents. Within this grade a sudden increase or diminution of the blood-volume causes only a very temporary increase or diminution of blood-pressure. The rapidity with which the blood-pressure returns to its normal value is so great that it cannot be accounted for by any diffusion of fluids between the blood and the tissues, and indicates that the regulating influences must be sought in the nervous system. This view is strengthened by the fact that after section of the cervical cord the phenomenon disappears.

Lesser[1] continued the series of experiments above described. He found that after loss of blood the blood serum becomes more watery and the coloring matter of the blood is diminished in amount. As this result follows even when both lymphatic ducts have been tied, it is evident that a *direct* diffusion of fluid from the tissues to the blood-vessels must take place. This diffusion of fluid and consequent dilution of the blood, as estimated from quantitative determinations of its solid constituents, is not sufficient to explain the observed diminution of the coloring matter of the blood, and the author is therefore led to the hypothesis that during the flow of blood from a divided vessel the first portions of blood which escape are relatively richer in globules than those which flow later, when the force of the blood-stream is diminished.

Experiments consisting in the introduction of an additional amount of blood into the vessels showed that under these circumstances a diffusion of fluid from the vessels to the tissues takes place, though the amount of this diffusion could not be accurately determined. It was found in these experiments that no morbid symptoms were produced even when the injected blood equaled in amount that which was normally present in the vessels.

It will be seen from the experiments of Worm Müller and Lesser that the limits within which the blood-volume may be varied with impunity are pretty wide ones, and that in an ordinary transfusion there can be little risk of producing a dangerous degree of plethora.

[1] Arbeiten aus der physiologischen Anstalt zu Leipzig, ix. 50.

The question whether the blood of animals may be safely transfused into the human system has lately received a good deal of attention. If was generally regarded as settled in the negative, when, a few years since, the work of Gesellius [1] again awakened an interest in the matter. This writer maintained the harmlessness of transfusions between two different species of animals, and between animals and men. This view was based upon statistics of the operation, and upon experiments of his own performed upon dogs, lambs, and calves. His method consisted in transferring the blood by means of a short glass canula directly from an artery of one animal to a vein of another animal or of a human being. Hasse [2] also transfused the arterial blood of lambs directly into the veins of patients suffering from phthisis and other diseases, and considered the results upon the whole favorable. He mentions, however, as frequent results of the operation, chills and fever, and sometimes hæmaturia, or rather "hæmoglobinuria," to use the term employed by Ponfick [3] to indicate the presence of the coloring matter of the blood, without any blood globules, in the urine. In addition to these symptoms, Fiedler and Birch-Hirschfeld [4] mention dyspnœa, pain in the back, vomiting, and sometimes urticaria, as the result of the direct transfusion of lamb's blood into consumptive patients. No improvement in the condition of the patients was observed.

Several fatal cases of lamb's-blood transfusion have been placed on record, but the autopsies have not thrown much light on the cause of death.[5] The subject has, however, been very thoroughly investigated in experiments on animals. Panum [6] experimented on dogs on which, previous to the transfusion, a depletion of corresponding amount had been made. He found that a transfusion of fifty-five per cent. of lamb's blood was fatal after three hours, while a transfusion of fifteen per cent. of calf's blood caused death after thirty hours. Bleeding from the wound and hæmaturia were constant symptoms. The autopsies showed hyperæmia of the kidneys, ecchymoses of the liver, and infiltration of blood into the mucous membrane of the large intestine. Ponfick [7] found that similar quantities (thirteen to eighteen per cent. of the normal blood-volume) produced fatal results when injected into the veins of dogs. Similar results were obtained by Mittler [8] in experiments on birds and mammals. He describes the kidneys as not only hyperæmic but as sometimes the seat of infarctions. Worm Müller has in a recent work [9]

[1] Die Transfusion des Blutes. St. Petersburg and Leipzig, 1873.
[2] Die Lammblut-Transfusion beim Menschen. St. Petersburg and Leipzig, 1874.
[3] Virchow's Archiv, lxii. 273.
[4] Deutsches Archiv für klinische Medicin, 1874, page 545.
[5] Masing, St. Petersburger medicinische Zeitschrift, iv. 68.
[6] Virchow's Archiv, xxvii. 448.
[7] Virchow's Archiv, xxvii. 304.
[8] Wiener Sitzungsberichte, lviii., 1868.
[9] Transfusion und Plethora. Christiania, 1875.

studied very carefully the effect of the transfusion of lamb's blood into dogs. He finds that a fatal result always follows the introduction into the circulation of a dog of a quantity of lamb's blood equal to twenty per cent. of the normal amount contained in the vessels. Neither a preliminary depletion of the dog nor defibrination of the lamb's blood diminishes the fatal effect of the transfusion.

Capillary hæmorrhage from the wound and blood-colored urine are the principal symptoms. The autopsies show almost always great hyperæmia of the kidneys, and frequently a similar condition in the lungs, with infarctions or small extravasations, effusion of blood into the intestinal canal, and bloody exudations into the peritoneal cavity.

Ponfick[1] has fixed the amount of lamb's blood which can be transfused into a dog without producing bloody excretions at one and a half per cent. of the dog's blood-volume. The statement of Gesellius that four per cent. can be thus transfused is probably explained by the fact that the method employed by this observer (direct transfusion from artery to vein by a short canula) does not permit the amount of blood transfused to be accurately measured.

It will next be of interest to consider how the above-mentioned symptoms and morbid appearances are produced. In the first place, it seems evident that the fever is not due to the transfusion of *foreign* blood as such, but to its transfusion *directly* from artery to vein; for it has been shown by Liebrecht[2] that fever may be produced in a dog by direct transfusion from an artery to a vein of the same animal. Here, of course, the blood-volume is unaltered, the only change being that the blood reaches the right side of the heart in greater abundance and in a less deoxidized condition than under normal circumstances. It is to a congestion of the portal system caused by this increased pressure in the venæ cavæ that the author is inclined to attribute the production of fever. He alludes in this connection to the increased size of the spleen in fever. In order to show that the fever in these cases was not traumatic, and due to the application of the ligatures, the vessels were in one experiment tied three hours before the transfusion took place. During this interval no fever occurred, but as soon as the transfusion was made the temperature in the rectum rose from 39.6° to 41.5° C.

The hæmoglobinuria implies destruction of the red globules and excretion of their coloring matter. How this takes place has been investigated by various observers. Landois,[3] in a series of experiments on a great variety of animals, comes to the following conclusions.

(1.) The blood-serum of many mammals dissolves the blood-globules of other mammals. Of the different sorts of serum thus far investigated,

[1] Virchow's Archiv, xxvii. 321.

[2] Centralblatt für die medicinischen Wissenschaften, 1874, page 580.

[3] Centralblatt für die medicinischen Wissenschaften, 1873, pages 883 and 897.

that of the dog is the most powerful in this respect, that of the rabbit the weakest.

(2.) Mammalian blood-globules have very different powers of resisting solution in the serum of other animals. The globules of the rabbit are very easily dissolved, while those of the cat and dog are very resistent.

(3.) In transfusions of foreign blood, the globules of one species are dissolved in the blood of the other. Defibrination of the transfused blood does not alter this result.

(4.) The constituents of the dissolved globules are excreted chiefly by the kidneys, occasionally also by the intestines, uterus, bronchial tubes, and into the serous cavities.

It will thus be seen that in any case of transfusion of foreign blood, the number of globules dissolved, and the consequent amount of hæmoglobinuria, will depend, first, upon the amount of blood transfused, and secondly, upon the solubility of the two sorts of blood-globules in the plasma of the blood with which they are mixed.

In a later article,[1] Landois follows very carefully under the microscope the solution of blood-globules in serum of a different sort of blood. The first effect which is observed when a drop of blood is placed in foreign serum is that the globules adhere together and become spherical. They then lose their coloring matter, the globules at the circumference of the drop being first affected. Finally, nothing remains but an adherent, tenacious mass of stroma substance, in which the outlines of the single globules are at first discernible, but after a slight agitation in the surrounding fluid these outlines disappear and the whole mass is seen to consist of tenacious threads and fibres. This fibrous substance thus formed from the stroma of the blood-globules is termed by the author "stroma-fibrin," to distinguish it from the ordinary or "plasma-fibrin." Landois considers that it is this sort of fibrin which Heynsius has described[2] as being derived from the blood-globules.

When, by the transfusion of foreign blood, two sorts of blood are mixed together in the circulatory system, the conditions necessary for the formation of stroma-fibrin are present, and the more venous the character of the blood, the more rapidly will the stroma-fibrin be formed, for it is found that the presence of carbonic acid favors the solution of the blood-globules.[3] The more rapidly the transfusion of foreign blood is made, the larger and more tenacious will be the masses of stroma-fibrin formed. When stroma-fibrin has once been formed in the circulation, it may act as a foreign substance and lead to the production of plasma-fibrin. The coagulation may thus become more extensive. Even

[1] Centralblatt für die medicinischen Wissenschaften, 1874, page 420.
[2] Pflüger's Archiv, ii. 1, iii. 414, and ix. 514.
[3] Cf. Brown-Séquard, Journal de Physiologie, i.

when the transfusion is made with the blood of the same species of animal, solution of blood-globules and formation of stroma-fibrin may occur when the globules of the transfused blood have lost their vitality. This may take place in consequence of exposure of the blood to too high a temperature, or of prolonged exposure to cold.

(*To be concluded.*)

## PROCEEDINGS OF THE BOSTON SOCIETY FOR MEDICAL OBSERVATION.

EDWARD WIGGLESWORTH, JR., M. D., SECRETARY.

October 18, 1875. *Multiple and Idiopathic, Medullary, Round-Cell Sarcoma of the Skin.* — This paper was read by Dr. Wigglesworth. It may be found in the *Archives of Dermatology* for January, 1876.

Dr. Bolles mentioned a case which he saw once at the City Hospital, of multiple hard red tumors of the skin of the breasts, abdomen, and arms of a woman under forty years of age. Those about the left breast, axilla, and left side were confluent, but all around the borders and beyond these limits they were scattered and single. They had been of slow growth, and caused inconvenience only by their pressure. He had seen the case but once, and it had been diagnosticated by the surgeon in attendance as cancer of the skin.

*Displacement of the Heart to the Right Side.* — Dr. H. I. Bowditch mentioned a case in which there was this transposition without any displacement of the other organs. Such cases, he said, are extremely rare. Usually if the heart is displaced the other organs are so likewise. The sounds of the heart were faint. No inflammatory disease was present.

Dr. Dwight asked if the patient were right-handed, as it was formerly believed that this condition or its opposite bore some relation to the position of the heart. This point had not been observed.

Dr. J. J. Putnam inquired if patients with such displacements were specially liable to disease.

Dr. Bowditch said the cases were too few to warrant any statements upon this point; that such cases, however, were usually detected by examination for some suspected disease.

*Enlargement of the Bursa Mucosa over the Ligamentum Patellæ.* — Dr. Porter showed two specimens.

Case I. C. G., aged fifty, born in Ireland, was by occupation a currier. The tumor followed a blow received ten years ago; it grew slowly at first, but rapidly during the last two years. At the time of operation it was five inches broad, six inches long, and three and one half inches thick; it was ovoid and movable, elastic and non-translucent. The skin over the tumor was tense, smooth, bluish, and its veins apparent. There was no pain, but inconvenience from the size and position of the tumor. August 25th, Dr. Porter made two incisions, about five inches each in length, through the skin on the top of the tumor, inclosing an elliptical-shaped piece of integument. The sac was dissected out entire. It was quite adherent to the patella. Only three ligatures were required, and

the flaps were brought closely together by numerous sutures, an opening being made in the outer flap low down to allow the escape of pus, and through this opening the ligatures were brought. The leg was placed on a ham-splint, and compression applied to the knee by bandaging over layers of cotton batting.

August 26th. Little or no pain since the operation. The leg was left untouched.

August 27th. Dressings removed. Leg looked well. No discharge or inflammation. Simple cerate was applied over the line of the incision, and a cotton-batting dressing reapplied.

August 28th. The alternate stitches were removed, and their place supplied by strips of plaster. The wound was dressed as before. Patient comfortable.

August 29th. One ligature removed; also the remaining stitches, and plaster substituted.

September 1st. The flaps have joined by first intention. Not a drop of pus since the operation, and no pain. All the ligatures came away the previous day.

September 3d. All dressings omitted, except cerate over the incision made in the outside flap for drainage, and which is rapidly healing.

September 8th. Patient sits up, nearly well.

September 10th. Discharged.

Case II. Ann W., a domestic, aged thirty-one, Swede, thirteen years ago injured her ankle. The knee does not seem to have been hurt, but the tumor has been noticed ever since. For the last three years the swelling has not increased in size; it is globular, movable, and measures five inches in length, four in breadth, and two and three quarters in thickness. It was excised October 9th.

*Triplets with Triplex Placenta.* — Dr. Fitz showed a placenta from a case of triplets, bearing three distinct sacs. It occurred in the practice of Dr. Doherty, of South Boston.

*Sarcoma of the Choroid.* — Dr. Hay showed a specimen of sarcoma of the choroid.

*Renal Calculus.* — Dr. C. P. Putnam showed a renal calculus of the size of a pea, which had required three weeks to pass from the kidneys to the bladder, with only intermittent pain, and this not excessive. There was no sudden cessation of pain. The calculus remained in the bladder about a week, and found its way to the end of the penis without difficulty. Here, according to the patient, it lodged all night, causing fearful pain, but disengaged itself in the morning.

*Facial Paralysis.* — Dr. J. J. Putnam related a case of facial paralysis following an operation during which the nerve had been divided. Recovery had taken place, though the prognosis is usually unfavorable.

*Surgical Cases.* — Dr. Beach read a paper which was reserved for publication.

*Dislocation of the Peroneus Longus Muscle.* — In regard to the dislocation of the peroneus longus, which subject had been referred to by Dr. Beach, Dr. Fifield said that Sir Astley Cooper recommended Schoolbred's laced

stocking. Dr. Beach had also alluded to a dislocation of the long tendon of the biceps muscle, quoting a case from the practice of Mr. John Soden, of Bath, Eng. Dr. Fifield thought that this state of things did not occur, and added that Mr. Robert Adams in his treatise on rheumatic gout had shown that there are no true dislocations of this tendon, unless very slow ones, though change of place may occur. He has in particular annihilated the case of Mr. Soden, of Bath, and shows that dislocation takes place by enlargement of bones with the addition of chronic rheumatic arthritis. Moreover, the long head of the biceps may entirely disappear without marked change in the position of the shoulder. The separation of the acromion in such cases is curious. As to the case of fracture of the external auditory process, which had been mentioned, Dr. Fifield was rather inclined to regard it as a case of fracture of the glenoid cavity. Morville, of Lanay, has given a series of these cases of fracture of the glenoid cavity. The paper may be found in the *Archives Générales de Médecine* for the years 1856 and 1858. In such fractures of the glenoid cavity, Dr. Fifield had always noticed that the bleeding was upon the right side.

In reply to the comments made by Dr. Fifield on the case of dislocation of the long head of the biceps, reported by Mr. Soden on July 6, 1841, Dr. Beach stated that, although Mr. Adams (from whose recent work on chronic rheumatic arthritis Dr. Fifield quoted) considers the injury to Mr. Soden's patient to have been a sprain and not a dislocation of the tendon, so high an authority as Sir James Paget, in his recently published Lectures and Essays, recognizes the dislocation, and at a lecture exhibited a specimen from the museum of St. Bartholomew's Hospital. He said, in reference to it, that "in this specimen, as in that of Mr. Soden (for the two are singularly alike), the long tendon of the biceps has slipped from its groove about half an inch inwards, and is there confined by a strong band of fibrous tissue, which passes over it and straps it down. Mr. Soden's case is in the museum of King's College." He also quotes a case recognized by Hamilton in his work on fractures and dislocations, in which there was no autopsy. Messrs. Flower and Hulke, in Holmes's Surgery, make the following reference to the injury: "In the opinion of Mr. Adams the reported cases of dislocation of the long tendon of the biceps, with partial displacement of the humerus upward, are also to be classed as the effects of disease and not of injury; but the proof of this appears to be not quite so satisfactory as in the former case," referring to those in which rupture of the tendon had taken place.

*Corrosive Ulcer of the Duodenum associated with Interstitial Nephritis.* — Dr. Tarbell read the case, and Dr. Fitz showed the specimen. The case was published in the Journal for December 23, 1875.

*Ununited Fracture of the Tibia and Fibula.* — Dr. Porter showed the specimen. The patient, a woman aged thirty-three, fell at the age of two years upon the floor, fracturing both bones of the left leg above the ankle. The injury was regarded as a sprain, and nothing was done for it for a year. A surgeon then operated, and, as the patient says, "cut the cords and set the bone." But, as far as the patient remembers, her leg was always in its present condition, namely, that before operation, when there seemed to be a false joint,

four inches above the inner malleolus, where the fragments meet at an angle, the bones never having reunited. The leg was considerably shorter than the other, and the foot atrophied, the patient wearing a shoe with an iron support beneath, to make up for shortening, and getting about only with the aid of crutches.

The patient received rest, hospital care and fare, and tonics for three weeks. October 23d Dr. Porter operated, the patient having been etherized. The leg was amputated above the point of fracture. Side flaps were taken below the fracture, and the incision was extended farther behind than in front, to secure better drainage. The leg had been bandaged before the operation; the hæmorrhage was slight, and only a few ligatures were needed. The patient recovered well from the ether without vomiting. Subsequent severe pain was relieved by morphia administered subcutaneously. The pulse was 80, and regular, but rather weak, and half an ounce of brandy was given every three hours.

November 15th (twenty-fourth day). The wound has been strapped for two days. The edges come well together, and the stump looks nicely.

*Calculus in a Child.* — Dr. Porter showed the specimen. October 20, 1875, J. J. C., aged four years, was brought to the Massachusetts General Hospital by his mother, who said that for two years he had been troubled by pain during and after his micturition, which was too frequent. Lately the pain had caused him to cry. At each time also the rectum became prolapsed, causing additional pain. Sounds were passed, and a small stone was detected in the bladder by the click communicated to the finger.

October 24th. The bowels were well cleared in the morning by an injection of soap and water. Dr. Porter operated, with the patient under ether. A metallic sound being passed, the stone was detected by the ear and by the finger. It was then removed by lateral lithotomy. An incision was made from the median line to the left side of the perinæum. No ligature was applied. The hæmorrhage was slight, and was checked by a sponge left in the wound for an hour. Before night the patient passed urine twice; the first time wholly through the wound, the second time half through the urethra and half through the wound.

The stone was oval and flat. Its weight was one hundred and six grains. Both the body and the nucleus, according to Dr. Wood, consisted almost entirely of uric acid.

October 25th. Patient doing well. No hæmorrhage. Good appetite. Pulse of good character, 144 to 150. Urine dribbles away slowly through the wound.

November 2d. Patient doing well. Pulse good, 110 to 120. At night passed his urine mainly through the urethra; exact amount not known.

November 3d and 4th. Passed urine wholly through the wound.

November 5th. Urinated wholly by the urethra three times in succession.

November 6th. Continues to pass urine by the urethra, and wound dry for two days.

November 15th. Wound nearly healed, and covered by a dry crust. Patient to be discharged to-morrow, well.

*Paralysis of the Soft Palate after Tonsillitis.* — Dr. J. J. Putnam reported

the case of a girl who had been sent to the out-patient department of the Massachusetts General Hospital by Dr. F. C. Shattuck, with complete paralysis of the soft palate unattended by other paralysis of any other kind; it followed what had been to all appearances an attack of severe suppurative tonsillitis. Electrical examination of the parts had shown that the palatine muscles did not react to the stimulus of the induced current, but readily to that of the galvanic current, indicating that the nerve filaments had degenerated. The question was whether, in view of the rarity of paralysis of the soft palate after simple tonsillitis, and the present prevalence of diphtheria, the case was not one of the latter disease in which, as sometimes occurs, there had been none of the characteristic inflammation in the throat.

*Paralysis of the Ciliary Muscle and Palate Muscles.* — In connection with the remarks of Dr. Putnam, Dr. Wadsworth mentioned two cases which he had recently seen of paralysis of the ciliary muscle after diphtheria; there was also difficulty of speech from paralysis of the palate muscles. There was no paralysis of the sphincter of the iris, which often accompanies the paralysis of accommodation. Both the patients were boys about eight years of age; in both the diphtheritic affection had seemed very slight, the exudation on the tonsils being of small extent and transient, so that it had appeared to the attending physicians hardly worth while to call the disease diphtheria. The symptoms of imperfection of speech and indistinctness of vision first appeared several days after apparent recovery. The indistinctness of vision was specially marked in one of the boys, who had some hypermetropia; in him it was present for all distances, while in the other boy it was manifest for near objects only. Letters which could be clearly made out at a distance of several feet could not be read when brought up to eighteen inches or less, but became again distinct when a convex glass was placed before the eye. One of the boys was now improving. The other Dr. Wadsworth had seen only once. This combination of paralysis of accommodation and of the muscles of the palate after diphtheria is not uncommon.

In answer to Dr. Putnam, Dr. Wadsworth said that he knew of no such case in which the ciliary nerves had been examined post mortem. The paralysis usually follows light cases, and there is generally recovery.

Dr. Putnam remarked that changes from presbyopia to myopia after diphtheria had been observed.

*Treatment of Perforations of the Membrana Tympani.* — A paper upon this subject was read by Dr. C. J. Blake.[1]

Dr. Green asked the size of the perforations which Dr. Blake had seen heal under the use of paper.

Dr. Blake said that they were always small. Generally, inflammation of the middle ear was set up, and the application of the paper caused growth, filling up and healing.

Dr. Green inquired the length of time that these perforations had existed.

Dr. Blake answered that, in recent cases, the paper seems to excite a renewal of the discharge. In his experiments tolerant cases had been selected.

[1] Journal, January 13, 1876, page 42.

*Case of Fibroma Molluscum.* — Dr. Wigglesworth showed a man affected by this uncommon and striking disease. The case is to be published in the April number of the *Archives of Dermatology*.

*Papilloma of the Larynx.* — Dr. Knight exhibited a papillary growth which he had removed from the larynx of a sailor from the Chelsea Marine Hospital. The patient had syphilis, but had been hoarse several months before the primary lesion of this disease; hence Dr. Knight inferred that the papilloma occurred independently of the syphilis. The larynx, however, presented the signs of a specific laryngitis at the time of Dr. Knight's first examination. A fine water-color of the larynx and growth, executed by Dr. Quincy, was shown. The growth was situated on the anterior part of the left vocal cord, near the angle of union of the cords. It was of about the size of a common white bean, and was removed in four pieces, the larynx having been previously trained about three weeks for a few minutes daily. The tongue and pharynx were unusually irritable in this case, but the larnyx rather less so than usual.

*Progressive Locomotor Ataxy.* — Dr. Edes reported the case. A man aged fifty-four, a brass-finisher, entered the City Hospital about the middle of June, 1875. The statements obtained as to the previous history were indefinite and contradictory. That which agreed best with subsequent observations was to the effect that his paralysis came on gradually, lasting ten years, and was supposed by him to be rheumatism. At the time of his entrance to the hospital he could not walk, but could move his legs pretty well in bed. Muscular irritability to the induced current was good. The muscles did not contract upon faradic irritation of the sciatic, but did so to the galvanic current. The patient felt the sponge everywhere, but it pained only when applied above the pelvis. The urine constantly dribbled away, and was afterward found to contain pus and phosphates.

No cerebral symptoms were noticed, except deafness. His condition did not change materially in any respect except that after two or three months he took a few steps with much assistance. Previous bed-sores had progressed toward healing. In November a diagnosis of reflex paraplegia was suggested, and a consequent examination disclosed the presence of a prostatic calculus.

He died in December, and an autopsy disclosed a bladder very much contracted and thickened, its inner surface red, rough, and granulated. In the prostate was a ragged cavity with sloughy walls, containing two calculi (probably uric acid) and pus. The spinal cord presented gray degeneration of the posterior columns. In the lumbar and lower dorsal regions this lesion occupied the entire space between the posterior horns, extending forward nearly or quite to the commissure. In the cervical region the area of degeneration became narrower and was confined to a strip close to the median line (wedge-shaped columns of Goll). The microscope showed in the fresh specimen granulation-cells, amyloid bodies, and some (though not extensive) fatty deposits along the blood-vessels. The fibres appeared much fewer in number than normal.

The lungs were very deeply pigmented with fibro-calcareous nodules at the apices.

Had the examination of the cord been omitted, the diagnosis of reflex paraplegia would have been apparently fully confirmed by the post-mortem results. Looking at the history, however, in connection with the complete autopsy, it seems highly probable that the ten years of "rheumatism" with gradually increasing paralysis mean the earlier stage of progressive locomotor ataxy, which brought the patient to the hospital only after one of the most distinctive features of that disease (the peculiar gait) was no longer available for diagnosis, since he did not attempt to walk until after two or three months. Any minute description by him of the precise nature of his disability was out of the question. The imperfect history also prevented any certainty as to the relation of the vesical and nervous troubles, though it is by no means improbable that the calculus may have been found as the result of the vesical paralysis which frequently forms a part of the disease.

*Concretions in the Bladder.* — In this connection Dr. Fifield called attention to the fact that a click or ring heard when a sound is introduced into the bladder does not always prove that a calculus of appreciable size is contained therein, since such click or ring may proceed either from a prostatic calculus partly projecting into the bladder and struck by the bow or convexity of the sound, or from an aggregation of small calcareous (?) particles temporarily massed together. In this case a second calculus was suspected on account of the ring when the sound was introduced, but with the finger in the rectum only a few grains of calculous matter deposited could be detected, and he had therefore refrained from operating.

## DR. SAMUEL GRIDLEY HOWE.

Dr. Howe, after a somewhat protracted illness, died at his residence in South Boston on January 9th. His life, three quarters of a century in length, embraced a period in the history of the world replete with interest, and although he was known chiefly to the present generation as the patient and painstaking instructor of the blind, in which capacity he has achieved a reputation far beyond the limits of his native city, his earlier years were passed in scenes of a far different character. During the Greek struggle for independence in 1824, he joined the Grecian army as a surgeon, and eventually organized a regular surgical service in which he occupied the chief place. For six years he continued his devotions to that country, when illness compelled him to leave. Always an enthusiast in the cause of liberty, we find him subsequently conferring with Lafayette during the revolution of 1830 in Paris, and again at Brussels; and later, during a short visit to Europe on business connected with his life's chief work, he was unable to refrain from rendering assistance to the Poles, an undertaking which led to his imprisonment by the Prussian authorities. He was soon at home again, however, and in 1832 opened the Perkins Institution for the Blind, at South Boston. He threw himself into this work with great ardor, and during a long period of service has contributed more, perhaps, than any other man to the improvement and happiness of an unfortunate class. He has the honor of being the inventor of the method of printing in raised letters, one of the greatest boons ever con-

ferred upon the blind, and by his words and writings has done much for their education all over the world.

He has taken a prominent part in the training of the idiotic and the feeble-minded, and was the principal of the school organized in 1851 for improving the condition of those classes. His philanthropic tendencies led him into many fields of labor which it is hardly within our province to notice. His political views are pretty widely known. He was the intimate friend of John Brown. At the outbreak of the war he became a prominent member of the Sanitary Commission, and at its close was appointed one of a commission to report upon the condition of the freedmen.

Dr. Howe's labors at the blind asylum are full of interest. They have been the admiration of poet, novelist, and many a distinguished visitor to the asylum. The case of Laura Bridgman alone was enough to have established his reputation in his special field, but this was but one bright feature in a life's work well and faithfully accomplished. We hope to be able to give at some future time a brief account of the teaching of the blind so quietly carried on at the South Boston asylum for over forty years. We must content ourselves now with a brief tribute of respect to the memory of its distinguished director.

## THE SEWERAGE OF BOSTON.

It gave us great pleasure a few weeks ago to notice with almost unqualified commendation the report of an official consultation upon the sanitary state of our city. The consulting body comprised five eminent physicians, and their views upon the diagnosis, the prognosis, and the treatment in the case under their consideration appeared in a high degree just and exhaustive. A single sentence may be quoted to show the opinion of this commission upon a point of paramount consequence: "We wish to state that our investigations into the nature and the causes of fatal disease in Boston have convinced us of the urgent necessity of providing the city with a more satisfactory system of sewers than we now possess." This emphatic and authoritative expression was the fruit of painstaking research, and was in entire harmony with the convictions of all, in the profession and out of it, who had given the matter any careful study.

But while those who had the sanitary welfare of the city at heart have for a long time appreciated the pressing need of improvement in our methods of sewage-disposal, their belief was based rather upon general impressions that something in our system was wrong than upon substantial evidence of facts. We therefore welcome as a most timely and useful document the report of the commission appointed last March by his honor, the mayor, to investigate the whole subject of our sewerage, and to present plans and estimates for the better removal of the sewage of our large and growing city. The commissioners (Messrs. E. S. Chesbrough and Moses Lane, distinguished civil engineers, and Dr. C. F. Folsom, the Secretary of the State Board of Health) have not disappointed the great expectations which were had in anticipation of their report; they have evidently carried forward their task in full appreciation of

its magnitude, and with a conscientious purpose to solve the immense problem imposed upon them.

We are impressed by the quality of authority which pervades this report: nothing is taken for granted; every statement is founded upon fact. Thus, we feel sure that we have before us the fruit of actual inspection when we read that the catch-basins under the manholes of our sewers are "literal open-mouthed cess-pools connected with the houses in all parts of the city;" that the sewer-outlets are so placed that the sewage matter must precipitate and decompose upon the flats; that sewers in Boylston Street and in Berkeley Street are simply "elongated cess-pools;" and that a large sewer which crosses the north end of the city, with an outlet at each extremity, "had a solid deposit five feet deep." Ample testimony is offered to demonstrate what previously was inferred, that our sewerage is lamentably defective and that the call for amendment is emphatically justified.

To solve this problem, to provide a plan whereby sewage shall start from the houses and go in a continuous current, without interruption, until it reaches its destination in deep water, the commissioners offer a scheme which appears sufficiently comprehensive to fulfill all the requirements of the situation, present and remotely prospective. They recommend the construction of two main intercepting sewers, one on the south side of Charles River and the other on the north side. Both discharge into the harbor far away from the city, the former at Moon Island, the latter at Point Shirley. By this plan, provision is made for the disposal of the sewage of a population of nine hundred thousand. For all the details with regard to the size of the sewers, their outfall, their inclination, their branches, their siphons, their pumping stations, and their reservoirs, we must refer our readers to the document itself, which discusses all these points with great perspicuity.

We presume there will be tolerable unanimity concerning the merits of this very inclusive and far-sighted scheme, until the question of cost comes up. The commissioners estimate that their plans will require an expenditure of $6,500,000 for their fulfillment. In times like these, when the spirit of economy and retrenchment is in the air, this seems like an extravagance. Into that question, however, we do not feel called upon to enter, except to protest in a general way against any penny-wisdom and pound-folly in matters affecting the public health. And we trust that our municipal law-givers will not lose much time in fruitless wrangling; if the present commissioners have not given us the best plan practicable in the interests alike of economy and of public hygiene, let us have another without delay. Enough is known to demonstrate the imperative need of immediate and radical action.

The report closes with the recommendation of certain measures intended to render dwellings free from sewer-gas and foul drain-smells. One of these is that soil-pipes be carried through the roofs to a point two feet above the latter, and at a distance from chimneys or windows. A second is that rain-water spouts be untrapped and discharge into the sewers, *provided that the upper ends be remote from windows or the tops of chimneys communicating with rooms occupied by human beings;* to this measure there would be some opposition, although we believe it to be a very conservative safeguard against sewer-

gas invasion, in close alliance with the first device, but to be continued only until proper ventilation is provided for the sewers themselves. Another recommendation by the commission meets our hearty approval, namely, that there shall be inspectors whose sole business it shall be to see that house-drains are properly constructed and kept in order, and that no new houses are occupied until they have been properly inspected and their drains have been found satisfactory.

## MEDICAL NOTES.

— Many of our readers, who have profited by the advantages of the General Hospital at Vienna, will be glad to learn that, according to our English exchanges, pathology in that city seems to be entering on a new era with the advent of Professor Hischl. The Pathological Institute is to be completely remodeled. New post-mortem rooms are to be built, with proper ventilation, and with windows in the roof, instead of, as at present, in the side walls. There will also be proper laboratories for microscopical work, in which the abundant material afforded by the gigantic General Hospital may be made practically available for the instruction of the students; hitherto this material has been allowed to run to waste in a most unsatisfactory manner. The transference of the medico-legal post mortems from the professor of pathological anatomy to the professor of forensic medicine will enable the former to devote himself exclusively to his proper subjects, while, at the same time, the appointment of three assistants instead of two will still further distribute the merely mechanical functions of the office, and permit the new professor to devote himself to really scientific work, as well as to bestow the necessary amount of time and pains on his course of lectures.

— Dr. John P. Mettauer, of Prince Edward C. H., Virginia, died at his residence November 22, 1875, in his eighty-eighth year. In times past he has contributed many articles to the JOURNAL. He entered, says the *Virginia Medical Monthly*, upon the practice of his profession when about twenty-one years of age, and continued constantly at his post until within a few days of his death. No Southern surgeon was more widely known. The *Richmond Dispatch* describes him as "a man of scrupulous integrity, high tone, much culture, and great gravity and dignity of manner."

— We have received from E. Steiger, New York, the Popular Health Almanac for 1876. It contains a variety of useful information for physicians and druggists, embracing an analysis of the chief popular nostrums, including soothing syrups, enamels, hair restorers, etc., the dangers or uselessness of which are commented upon by good authorities.

— From the same source comes also a pamphlet entitled Wildungen: its Baths and Mineral Springs, written by the resident physician, Dr. Stoecker, and translated into English by Dr. Charles Hayer. The springs are alkaline and chalybeate, and are situated in the Duchy of Waldeck; the climate is that of Central Germany.

— G. P. Putnam's Sons have published a pretty little volume entitled In Memoriam, containing a biographical sketch of Dr. Ernst Krackowizer, an

address delivered before the New York Academy of Medicine in November last by Dr. Jacobi; also remarks by Hon. Carl Schurz and several members of the German element of the profession in New York. Dr. Krackowizer was an Austrian by birth, and was brought up in the Allgemeines Krankenhaus, and according to Dr. Jacobi would have been the legitimate successor of Schuh, had his political relations with his country permitted him to remain in his native city. He has for twenty-five years been a resident of New York, and the memorial testifies to the good opinion in which he was held by his professional colleagues in that city.

— Dr. Hasse, of Nordhausen, according to *L'Union Médicale*, recommends in cases of lipoma injections of alcohol. He injects a quantity of the liquid into the tumor at various points at intervals of several days, and, as a result the growth soon softens and fluctuates. It only remains to incise the tumor and to evacuate with slight pressure the oily liquid which it contains. The reaction is ordinarily slight.

— A case of recovery from extensive loss of the bones of the head is reported by John R. Hayes, M. D., in the *British Medical Journal* of December 25, 1875. The patient was found May 24, 1874, with an extensive burn on the right side of the head and face, the result of falling into the fire while intoxicated. Extensive sloughing of the integument took place. There were several attacks of delirium during convalescence, and at one time there was paralysis of the left arm and leg. After a time the right parietal and half of the frontal bone became separated from those of the opposite side, and were removed on October 3d. Their inner surface was covered with a thick, curdy matter, and the depressions for arteries, etc., were obliterated. The surface of the dura mater was covered with florid granulations, and a quantity of fœtid pus came away. The pulsation of the meningeal arteries could not be seen nor felt. On making slight pressure on each side of the head a quantity of pus welled from between the hemispheres. She had neither headache nor other cerebral symptoms. With the exception of a feverish attack in December, 1874, the patient has remained in good health up to the time of Dr. Hayes's report of the case, April 13, 1875. She goes about at her ordinary duties, not complaining of pain or of any ill effects from the terrible accident.

## MAINE GENERAL HOSPITAL.

### MEDICAL CLINIC.

BY E. E. HOLT, M. D.

*Chronic Diarrhœa; Treatment largely with Bisulphite of Soda.* — I. L. H., aged thirty-five, was admitted to the hospital, July 8, 1875, with a history of chronic diarrhœa, which was contracted in the army during the Rebellion. It had been very troublesome, and seven months previously he had had a severe attack, which had continued unabated, although all former means had been employed to check it. Frequently he was obliged to go to stool twenty-five times during the night. The stools were light-colored, usually watery and

slimy, of a very offensive odor, staining the vessel reddish-brown, and containing pus mingled with very little blood. Pain and tenderness existed in the right lumbar, right hypochondriac, and epigastric regions. He was much emaciated, his appetite was poor, and he kept about only by a persistent exercise of his will. He had always been temperate in his habits.

Dr. Thayer ordered a milk diet, a solution of bisulphite of soda (twenty-six minims every six hours), and a powder of opium (half a grain) and subnitrate of bismuth (six grains), to be taken every four hours till the pain and the discharges diminished.

July 10th. Very little pain. Patient was not obliged to get up during the night.

July 14th. No pus or blood found in the discharges, which are lessening gradually. Pain still diminishing, and the patient rests very well at night; the powder is taken only twice daily.

July 16th. Patient feels somewhat stronger; the soreness and pain are nearly gone. The appetite is still poor; tincture of the chloride of iron (eight drops) in syrup of ginger was prescribed to be taken after each meal.

July 24th. Patient improving; has only six dejections daily, the color and consistency of which are more normal; ordered to take subnitrate of bismuth (seven and one half grains) before each meal, the powder of opium and bismuth at bedtime, and to indulge his appetite moderately. No change with bisulphite of soda.

August 28th. There is an eruption on the sides of the face, which constantly scabs over; it has always grown worse as the diarrhœa is diminished; nitrate of mercury ointment to be applied. As the appetite has improved, the patient has eaten sparingly of meats, vegetables, and ripe fruit; his strength is good, and his weight is more than at any time since the war. His abdominal symptoms have disappeared, and he now has two normal dejections daily. He has gradually left off the opium and bismuth, and is discharged, with orders to continue the bisulphite of soda before each meal, and the iron afterward.

*Continued Fever (Typhoid); Large Doses of Quinine with little Effect on the Temperature.* — Bridget F., aged twenty-one, single, came from Ireland about twelve months ago; she was admitted to the hospital, August 31st, in such a stupid state that but little could be learned of the history of the attack. There was fever, epistaxis, bronchitis, anorexia, and constipation. There were no marked abdominal symptoms, but a measly eruption was present, which extended over the trunk and extremities. This was thought to be due to the condition in which Dr. Gordon had found her the day before: buried in blankets and sweating profusely. Directions were given that her bowels be moved by laxatives, and that tincture of aconite (one drop) be taken in solution of the acetate of ammonia (one drachm); light diet of milk, beef-tea, etc.

September 7th. The temperature begins to rise early in the afternoon, and at seven it generally reaches 104°; in the morning it is about normal. The pulse varies correspondingly, ranging between 80 and 105. The eruption does not reappear as it gradually fades away; other symptoms continue. To take spirits of nitrous ether and solution of acetate of ammonia, of each, half a drachm, every four hours, alternating with quinine (two grains).

September 13th. The temperature reached about 105° and the pulse 110 in the evening, both becoming normal before morning. Some delirium; bowels kept open by laxatives and enemata. The eruption has disappeared. With a view to break up the evening exacerbations, Dr. Thayer ordered twenty grains of quinine in divided doses between 11.45 A. M. and 12.15 P. M.

September 14th. Temperature 105° last evening; pulse 100. To take thirty grains of quinine in divided doses between 11.15 and 11.45 A. M.

September 15th. Temperature 104° last evening; pulse 92; both normal this morning. To take thirty-two grains of quinine between 11.15 and 11.45 A. M.

September 16th. Temperature 104.7° last evening; pulse 92; both nearly normal this morning. It will be seen that the quinine made but a slight change in the temperature, which continued to rise and fall for thirty-three days, the average evening temperature being 103.2°; the morning 99.2°, making a difference of 4°. The treatment otherwise was expectant, and at the end of the time mentioned the patient was convalescent, and made a good recovery.

COMPARATIVE MORTALITY-RATES FOR THE WEEK ENDING JAN. 8, 1876.

| | Estimated Population. | Total Mortality for the Week. | Annual Death-Rate per 1000 during Week |
|---|---|---|---|
| New York | 1,060,000 | 547 | 27 |
| Philadelphia | 800,000 | 391 | 25 |
| Brooklyn | 500,000 | 254 | 26 |
| Boston | 342,000 | 154 | 23 |
| Providence | 100,700 | 22 | 11 |
| Worcester | 50,000 | 13 | 14 |
| Lowell | 50,000 | 24 | 25 |
| Cambridge | 48,000 | 23 | 25 |
| Fall River | 45,000 | 18 | 21 |
| Lawrence | 35,000 | 11 | 16 |
| Lynn | 33,000 | 12 | 19 |
| Springfield | 31,000 | 8 | 13 |
| Salem | 26,000 | 7 | 14 |

Normal Death-Rate, 17 per 1000.

BOOKS AND PAMPHLETS RECEIVED. — Note-Book for Cases of Ovarian Tumors and other Abdominal Enlargements. By Dr. H. Lenox Hodge. Philadelphia: Lindsay and Blakiston. 1875.

Medical Diagnosis with Special Reference to Practical Medicine. By J. M. Da Costa, M. D. Fourth Edition, revised. Philadelphia: J. B. Lippincott & Co. 1876. (For sale by A. Williams & Co.)

Wildungen: Its Baths and Mineral Springs. By Dr. A. Stoecker. London: Trübner & Co. 1875. (Received from E. Steiger, New York.)